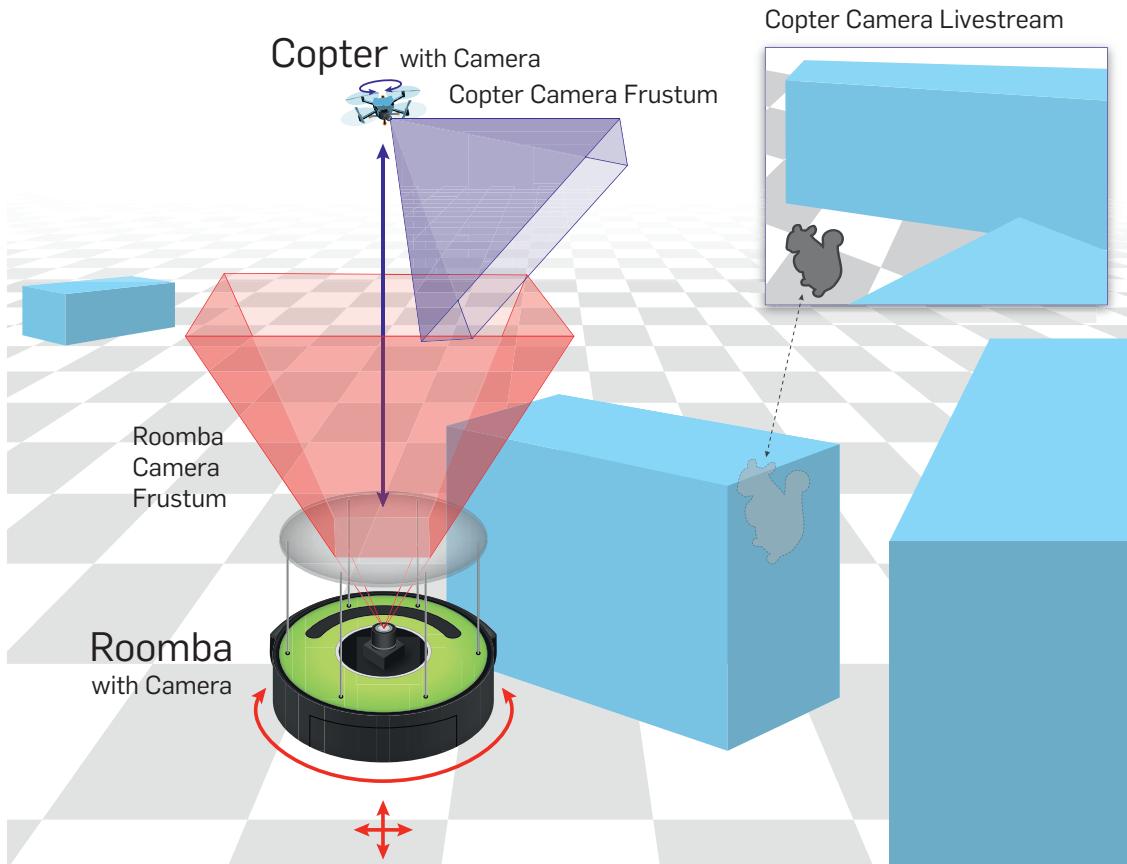


# FLYPER the FLYing PERiscope



The FLYing PERiscope (FLYPER) is a cooperation between a moving ground robot and a flying vehicle. During operations the ground robot is carrying a multicopter on a landing platform. At special events like hitting an obstacle, the multicopter is started to get a better overview about the scene from a higher place or to search for an object. This information can be used to navigate the robot to objects, which are not discovered yet. To control the multicopter flawlessly, it is tracked optically by the ground robot. Therefore an active element with LEDs (marker) is attached to the multicopter and a camera on the robot recognizes it. Afterwards, the 3D position and orientation is estimated.

The environment scan is done with the ORB-SLAM algorithm. SLAM approaches are used to localize a vehicle within an unknown environment and to create a sparse three-dimensional reconstruction of this environment. ORB-SLAM is based on ORB-features and can be executed in real-time. In the context of this project, ORB-SLAM is a monocular SLAM approach. Therefore, the multicopter has an onboard camera which streams the live images to a base station. The ORB-SLAM algorithm is now able to recognize and reconstruct the environment of the robots well, while the multicopter is also localized within this reconstructed map. Additional processing gains new knowledge about potential obstacles and enables a more precise navigation.



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